# A Technique to Guide and Measure the Reduction of a Processed Mandibular Complete Denture for Resilient Soft Liner

**Rachana J Shah[1], Sujal G Shah[2]**

[1] Department of Prosthodontics, Government Dental College and Hospital, Ahmedabad, Gujarat, India
[2] Private Practitioner, Ahmedabad, Gujarat, India

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**Abstract**

A resilient soft liner (RSL) has been used in processed complete dentures but controlling its thickness has always been a challenge because of uneven reduction of the denture's intaglio surface. Use of a thermoplastic vacuum-formed template and an endodontic K-file, as guides, for the reduction of a processed mandibular complete denture to receive RSL is described in the present report.

A processed mandibular complete denture is prepared by reducing its borders and drilling holes in its surface. A thermoplastic sheet adapted to the intaglio surface and an endodontic K-file with rubber stop adjusted to the desired dimension are used as guides to the reduction procedure and allows intermittent measuring of the reduced areas.

This technique helps in reducing the processed denture's intaglio surface in a controlled manner thus maintaining the strength of the denture base and effectiveness of soft liner. It also makes the application of resilient soft liner a cost and time effective maneuver.

**Key words:** Complete denture, prosthesis, resilient soft liner.

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## Introduction

The introduction of newer materials and techniques has given way to the use of resilient soft liner (RSL) in dental prosthesis. Some indications for the use of soft liner are:

a-Congenital or acquired oral and maxillofacial defects requiring prosthetic restorations (1).

b-Residual ridges with minimal thickness of soft tissue (1).

c-Chronic soreness of the oral tissues related to the wearing of dentures (1).

d-Poorly contoured ridges in which surgical intervention is contraindicated (1).

e-Sharp ridges produced by resorption of the denture supporting structure (1).

f-Patients who have received radiation therapy (2).

A minimum of 2 mm of liner and 3 mm of acrylic resin denture base thickness is recommended by many authors for making a denture with a resilient (3-5). A liner thickness of 3 mm provides optimum resilience, while greater thicknesses offer little increase in this physical property (4,5). Fabrication of a prosthesis with precise liner thickness ensures longevity of both material and prosthesis.

There are many studies in literature indicating the use of variety of spacer to create desired space for RSL in a new denture (3-5). But there is no technique that guides and measures the reduction of denture impression surface in an already processed denture. RSL is difficult to adjust clinically and therefore, accurate impressions, jaw records and processing techniques are most important to the success of liner (6). This article describes a technique to create space of desired dimension (2 mm) in a processed mandibular complete denture for the RSL by using a translucent, vacuum-formed template and an endodontic K-file as guide.

## Method

For a processed denture to be lined by a heat polymerizing RSL, make a definitive cast from the denture, followed by the conventional flasking procedure for formation of mould. Remove the denture from the flask. Note that the further steps for denture reduction, both for chemically and heat polymerizing RSL are the same.

**Fabricating the template from the processed mandibular complete denture**

1. Mark a line 2 mm below the borders on the polished surface of the denture with an indelible pencil (Fig. 1). Trim the borders of the denture up to the line with an acrylic trimming bur (DIADUR; DFS Diamond GmbH, Germany) creating a flat surface (Fig. 2). This reduction results in a 2mm thickness of RSL at the borders.

2. Drill 3 to 5 holes of 1-mm diameter extending from the intaglio surface to the polished surface using a flat fissure bur (DIADUR; DFS- Diamon GmbH, Germany). One of the holes is drilled lingual to the central incisors and other two, in the premolar and molar region, on either side (Fig. 2).

3. After drilling holes, place the denture on the thermoforming unit (Plastvac P7; Bio-Art Equipamentos Odontológicos Ltda, Brazil). The intaglio surface of the denture faces the thermoplastic sheet (Gasket; 3A MEDES, Korea) which is held by the unit's clamp. The occlusal surface and the exit of holes are embedded in the beads which occupy the platform area (Fig. 3).

**Figure 1.** Denture with line drawn 2 mm below border

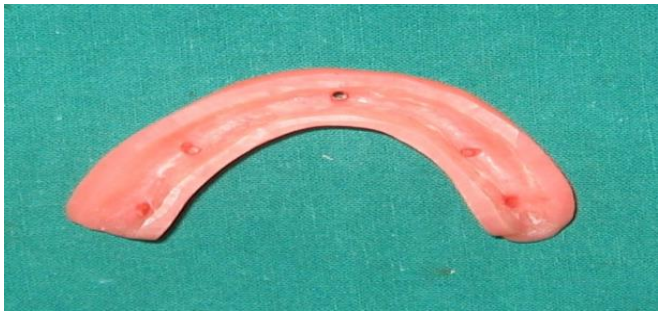

**Figure 2.** Denture after border reduction and drilling of holes

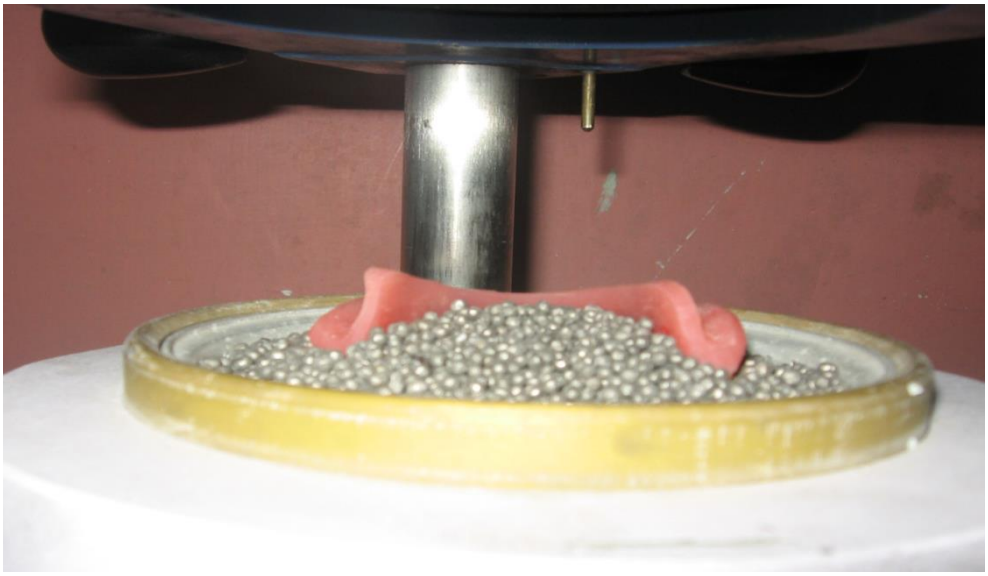

**Figure 3.** Denture placed on thermoplastic unit with holes embedded in beads

4. As the unit activates the electric coil, the sheet enters a visco elastic phase due to the temperature rise. Lower the clamp to bring the softened sheet in contact with the intaglio surface of the denture. A motor in the lower part of the unit immediately creates vacuum through the holes drilled in the denture resulting in the proper adaptation of sheet to the concave intaglio surface. Wait for the sheet to cool down before cutting its excess beyond 2 mm of the denture's polished surface with the aid of a scalpel.

**Reduction of Denture Impression Surface**

1. Remove the adapted template from denture and start reducing the intaglio surface with the use of an acrylic trimming bur. The reduction is checked intermittently by placing the template on denture and measuring with an endodontic K-file (MANI; INC, Japan) with the rubber stop adjusted to 2-mm length. Continue till the desired reduction is achieved throughout the impression surface (Fig. 4).

After this predetermined reduction of denture, RSL application can be done according to manufacturer's instruction.

Soft liner fills the drilled holes aiding in its mechanical retention to the denture base. Fill the remaining portion of the holes with auto polymerizing acrylic resin (RR Cold Cure; DPI, India) (Fig. 5).

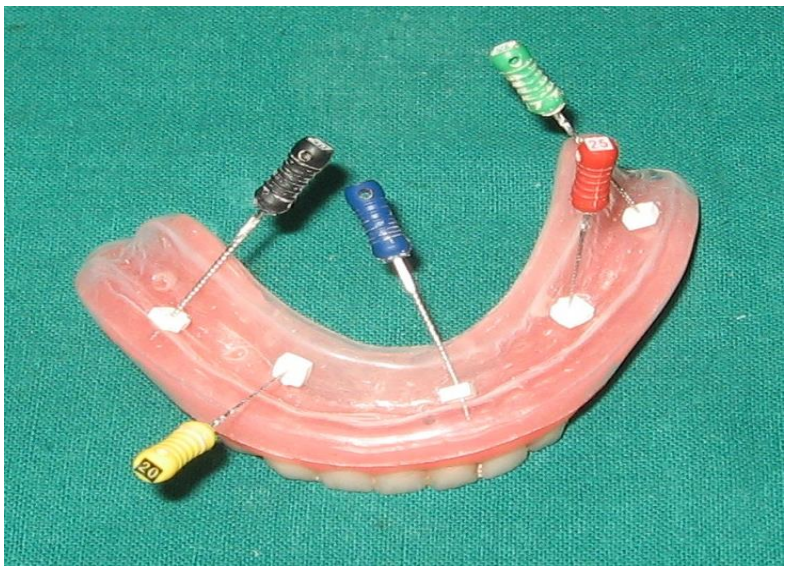


**Figure 4.** Denture reduction is checked by using thermoplastic template and endodontic K-file

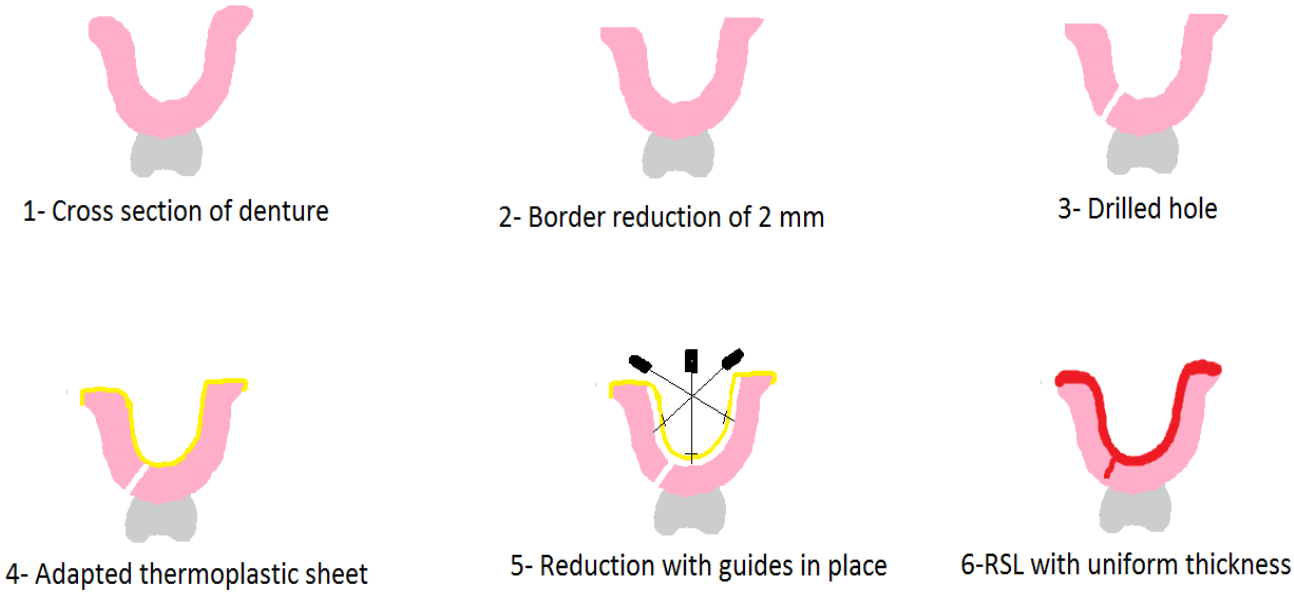


**Figure 5.** Schematic diagram of the technique

## Discussion

Uniform thickness of 2 mm of soft liner on the tissue surface of the denture is recommended by the manufacturer and several authors (7-9). Traditionally, application of RSL in an already processed denture involved trimming of the intaglio surface of the denture approximately. Clinically it is very difficult to obtain a uniform space on the tissue surface of the dentures and despite making every effort there will be many areas of denture which will have varying thickness of soft lining material (10). This hampers the efficient functioning of the liner. Moreover, the uneven reduction of the denture compromises the strength of the denture base. Hence, this technique of denture reduction, using a thermoplastic template and an endodontic k file as a guide, results in desired thickness of RSL leading to substantial clinical benefits.

A technique to guide the reduction of the denture surface will decrease the chances of denture fracture due to over reduction. Additionally due to the guided reduction of the surface, the amount of RSL required is controlled, making the application of RSL a cost effective procedure.

The advantages of the thermoplastic sheet used in this technique are its easy availability, transparency, flexibility, and low cost. The transparency allows checking its proper seating on the denture for visual control of the reduction procedure. Flexibility allows easy removal and placement without damaging the denture, and easy penetration by the endodontic K-file. The use of vacuum-formed sheet has the disadvantage of improper adaptation to the concave impression surface of the denture because it is inherently difficult to achieve simultaneous, even pressure. Holes drilled in the denture, with its occlusal exit being kept open by embedding in the beads, overcomes this problem by creating vacuum through air suction. After the application of RSL, these holes get partly filled by the liner and the remaining portion is filled by auto polymerizing acrylic resin to restore the continuity of the denture surface. Auto polymerizing acrylic resin shows good repair strength that may be attributable to a high rate of cross-linking between similar resin base materials (11).

The reduction of borders by 2 mm, before adaptation of the sheet, serves as a fix position for the template while the intaglio surface is being reduced. Flat surface of the reduced border provides for the butt joint between the denture and the RSL.

The use of this technique also allows the clinician to save time by allocating the work of reducing the denture impression surface to an assistant.

## Conclusion

This article describes a time and cost effective technique for the reduction of the intaglio surface of a processed mandibular complete denture by using a thermoplastic vacuum-formed template and an endodontic K-file as guide. This technique leads to an optimum thickness of RSL and denture base, increasing the success rate of the prosthesis.

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**Corresponding Author:**
Rachana Shah
108, "The Smile Makers Dental Clinic"
Neelkanth Plaza, Bhattha, Paldi,
Ahmedabad- 380007
Gujarat, India
Phone: +91 9898111179
E-mail: doc_rach2000@yahoo.com